

UNIT 1-HISTORICAL ACCOUNT OF MUSHROOM

Importance:

Mushrooms are being used as food since time immemorial. These have been considered as the delicacy. From the nutrition point of view mushrooms are placed between meat and vegetables.

- These are rich in protein, carbohydrate and vitamins. Mushrooms are low in caloric value and hence are recommended for heart and diabetic patients. They are rich in proteins as compared to cereals, fruits and vegetables. In addition to proteins (3.7 %), they also contain carbohydrate (2.4 %), fat (0.4%), minerals (0.6 %) and water (91%) on fresh weight basis. Mushrooms contain all the essential nine amino acids required for human growth. Mushrooms are excellent source of thiamine (vitamin-B1), riboflavin (B2), niacin, pantothenic acid, biotin, folic acid, vitamin C, D, A and K which are retained even after cooking. Since mushrooms possess low caloric value, high protein, high fibre content and high K: Na ratio, they are ideally suited for diabetic and hypertension patients. They are also reported to possess anticancer activities.
- India is primarily agriculture based country blessed with a varied agro-climate, abundance of agricultural waste and manpower, making it most suitable for cultivation of all types of temperate, subtropical and tropical mushrooms. It can profitably be started by landless farmers, unemployed youths and other entrepreneurs. It requires less land as compared to other agricultural crops and is basically an indoor activity. These are the ideal tools for recycling the agricultural wastes which otherwise may pose problem of disposal and atmospheric pollution.
- Therefore, mushroom cultivation is not only of economic importance but also has important role to play in integrated rural development programme by increasing income and self employment opportunities for village youths, woman folk and housewives to make them financially independent.

History:

A. Button mushroom

- **1630:** Cultivation of white button mushroom started first in France in the open on ridges made out of horse dung manure.
- **1707:** Tournefort at Royal Academy of Science, France, mentioned about compost preparation and mushroom cultivation.

- **1731:** French method of cultivation was introduced into England by Miller.
- **1779:** Abercrombie described a method of composting stable horse manure in stacks.
- **1831:** Callow grew mushroom in cropping houses warmed by fire heat and got fairly good yield (1.5 lbs/sq.ft)
- **1893:** Costantin pointed out that the incidence of diseases made constant changing of growing area necessary.
- **1902:** Ferguson published details of spore germination and growing of mycelium.
- **1905:** Duggar succeeded in making mycelium cultures from the tissue of mushroom caps.
- **1929:** Lambert discovered that spawn could also be prepared from single spore cultures.
- **1937:** Sinden found that about one third of monospore cultures of *A.bisporus* prepared were incapable of producing fruit bodies.
- **1950:** Sinden and Hauser introduced —Short Method of composting.
- **1973:** The first strain of *A.bitorquis* introduced commercially by a French firm Somycel as

B. Oyster mushroom:

- **1917:** Falck described the first successful cultivation of *Pleurotus ostreatus*.
- **1951:** Lowhag was the first to grow *Pleurotus* on sawdust mixtures.
- **1962:** Bano and Srivastava reported mass production on straw-based substrates and their work paved the way for large scale commercial exploitation.

HISTORY AND CULTIVATION OF MUSHROOM IN INDIA

India is primarily agriculture based country blessed with a varied agro-climate, abundance of agricultural waste and manpower, making it most suitable for cultivation of all types of temperate, subtropical and tropical mushrooms. It can profitably be started by landless farmers, unemployed youths and other entrepreneurs. It requires less land as compared to other agricultural crops and is basically an indoor activity. These are the ideal tools for recycling the agricultural wastes which otherwise may pose problem of disposal and atmospheric pollution.

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History of Mushroom Cultivation in India

Cultivation of edible mushrooms in India is of recent origin, though methods of cultivation for some were known for many years. The important historical developments in the cultivation of edible mushrooms are as below:

- **1886:** Some of specimens of mushrooms were grown by N.W. Newton and exhibited at the annual show of Agriculture, Horticulture Society of India.
- **1896-97:** Dr. B.C. Roy of the Calcutta Medical College carried out chemical analysis of the local mushrooms prevalent in caves or mines.
- **1908:** A thorough search of edible mushroom was initiated by Sir David Pain.
- **1921:** Bose was successful in culturing two agarics on a sterilized dung medium, details of which were published in the Indian Science Congress held at Nagpur during 1926.
- **1939-45:** Attempts on experimental cultivation of paddy straw mushroom (*Volvariella*) was first undertaken by the Department of Agriculture, Madras.
- **1941:** Padwick reported successful cultivation of *Agaricusbisporus* from various countries but without much success in India.
- **1943:** Thomas *et al.* gave the details of cultivation of paddy straw mushroom (*V. diplasia*) in Madras.
- **1947:** Asthana reported better yields of paddy straw mushroom by adding red powdered dal to the beds. He suggested April-June as the most suitable period for cultivating this mushroom in central Provinces and also carried out the chemical analysis of this mushroom.
- **1961:** A scheme entitled —Development of mushroom cultivation in Himachal Pradesh was started at Solan by the H.P. State Govt. in collaboration with I.C.A.R. This was the first serious attempt on cultivation of *Agaricusbisporus* in the country.
- **1962:** Bano *et al.* obtained increased yield of *Pleurotus* on paddy straw.
- **1964:** Cultivation of *Agaricusbisporus* on experimental basis was started by CSIR and State Govt. at Srinagar in J&K.
- **1965:** Dr. E.F.K. Mantel, F.A.O., Mushroom Expert, guided and assisted Department of Agriculture for construction of modern spawn laboratory and a fully air conditioned mushroom house. Research on evaluation of different strains and use of various agricultural wastes, organic manures and fertilizers for preparing synthetic compost were undertaken. Dr. Mantel's consultancy concluded after a period of 7 years.
- **1974:** Dr. W.A. Hayes, F.A.O., Mushroom Expert, guided further in improving the method of compost preparation, pasteurization and management of important parameters in the

mushroom house. New compost formulations, casing materials and important parameters like nitrogen content in the compost, moisture in the casing mixture, air movements and maintenance of proper environmental factors were also standardized which raised the mushroom yields from 7 to 14 kg/m².

- **1977:** A 1.27 crore, Mushroom Development Project was launched under U.N.D.P by the Department of Horticulture (H.P) wherein the services of Mr. James Tunney were made available. He got a bulk pasteurization chamber constructed and made available readymade compost and casing to the growers of H.P. The U.N.D.P. Project was concluded during 1982 and since then the Department of Horticulture (H.P) is running the project.

- **1982:** The Indian Council of Agricultural Research (ICAR) sanctioned the creation of National Centre for Mushroom Research and Training (NCMRT) during VIth plan on October 23, 1982 with the objectives of conducting research on mushroom production, preservation and utilization and to impart training to scientists, teachers, extension workers and interested growers.

- **1983:** All India Coordinated Project on Mushroom (AICRPM) was initiated during VIth Five-Year Plan on 01.04.1983 with its headquarter at National Research Centre for Mushroom Presently known as Directorate of Mushrooms.

- Presently there are ten co-ordinating and one co-operating centres working under AICRPM located in 11 states. Of these, nine centres are based at State Agricultural Universities, while two at the ICAR institutes.

Reference : culture technique Dr. C. D. Thapa, Dr. V. Prakasam, Sh. Mohinder Singh

Website : www.agrimoon.com

Importance and nutritional value of mushrooms

Importance of mushrooms

1. Mushrooms as saprophyte/decomposers Mushrooms help in the recycling of matter

2. Mushrooms as food source

About 2 000 - 5 000 species are used as food. Mushrooms serve as the major protein source

3. Mushrooms in medicine

About 1 800 species are used as medicines. Some cultivated mushrooms such as *Lentinus edodes* (Shiitake) are medicinal because they lower blood pressure and have low cholesterol content. A lot of our indigenous mushrooms have medicinal value. What is needed is a survey in the rural areas to tap this information from the old rural folk.

4. Mushrooms in bioremediation

Mushrooms secrete various enzymes which hydrolyse unwanted waste material from industry.

Fungi also degrade polycyclic aromatic hydrocarbons while some fungi produce oxidative enzymes used in bio-bleaching and bio-pulping to replace the unfriendly chemicals such as chlorine which usually ends up in drinking water. Fungi can also absorb heavy metals, thus they can be used to clean up the environment.

5. Importance of mushrooms

Mushrooms provide a healthy source of protein, vitamins (B, C and D) and carbohydrates.

6. Cancer

The antioxidant content in mushrooms [may help prevent](#) lung, prostate, breast, and other types of [cancer](#), according to the National Cancer Institute.

7. Diabetes

Dietary fiber may help manage a number of health conditions, including [type 2 diabetes](#) fiber may help reduce blood glucose levels.

A cup of sliced, raw mushrooms, weighing [70 grams](#) (g), provides almost 1 g of fiber.

Mushrooms, beans, some vegetables, brown rice, and whole-grain foods can all contribute to a person's daily requirement of fiber.

8. Heart health

The fiber, [potassium](#), and vitamin C in mushrooms may contribute to cardiovascular health.

Potassium can help regulate [blood pressure](#), and this may decrease the risk of [hypertension](#) and cardiovascular disease

9. In pregnancy

Many women take [folic acid](#), or [folate](#), supplements during pregnancy to boost fetal health, but mushrooms can also provide folate.

10. Other benefits

Mushrooms are rich in B vitamins, such as:

- riboflavin, or B-2
- folate, or B-9
- thiamine, or B-1
- pantothenic acid, or B-5
- niacin, or B-3

B vitamins help the body get energy from food and form red blood cells. A number of B vitamins also appear to be important for a healthy brain.

The choline in mushrooms can help with muscle movement, learning, and memory. Choline assists in maintaining the structure of cellular membranes and plays a role in the transmission of nerve impulses.

Nutritional Value of Mushrooms:

Why are edible mushrooms considered a healthy food? In terms of nutrition they contain:

- **Protein** - Most mushrooms have a high protein content, usually around 20-30% by dry weight. This can be useful for vegetarians or anyone looking to increase the protein content in their diet.
- **Fiber** - Helps lower cholesterol and is important for the digestive system.
- **Niacin and other important B vitamins** - As certain B vitamins are found in animal tissue but not plants, this can be another good supplement for vegetarians.
- **Vitamin D** - Essential for the absorption of calcium.
- **Copper** - Aids in helping the body absorb oxygen and create red blood cells.
- **Selenium** - An antioxidant that helps neutralize free radicals, thus preventing cell damage and reducing the risk of cancer and other diseases. Mushrooms contain more selenium than any other form of produce.
- **Potassium** - An extremely important mineral that regulates blood pressure and keeps cells functioning properly. A large portobello mushroom is said to have more potassium than a banana.
- **Other important minerals** - Such as phosphorous, zinc, and magnesium.
- **Low levels of fat, calories, and sodium**
- **No cholesterol**

Reference : culture technique Dr. C. D. Thapa, Dr. V. Prakasam, Sh. Mohinder Singh

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Edible mushroom



1. White button mushrooms

White button mushrooms are the most common and mildest-tasting mushrooms available in the Indian market. Button mushrooms, also known as cultivated mushroom or champignon (de Paris), are less intensely flavoured than many of its more exotic types. It can be eaten raw or cooked and are best used in soups, salads and on pizzas. Despite the common belief that these mushrooms are not as healthy as others, these have some interesting health benefits. White button mushrooms are low in calories and sugar. They are rich in protein and due to their exposure to sunlight, mushrooms are a natural non-animal source of vitamin D2; it helps in the absorption of calcium in your body and helps keep your bones strong. It is also rich in vitamin B12 which is an animal-obtained vitamin and so mushrooms are a good option for vegetarians. White mushrooms are also known to have cancer-fighting properties and help in reducing blood sugar levels and improve insulin resistance. Also, it is prebiotic and helps improve gut bacteria.

2. Portobello Mushrooms



Portobello Mushrooms are a native to Europe and North America grasslands, these are one of the most commonly consumed mushrooms in the world. When young, portobello mushrooms are known as white button mushrooms. These mushrooms are impressive because of their size and meaty texture and earthy flavour. Similar to its other varieties, portobello is one of the natural sources of vitamin D. They are rich in copper and selenium which your body needs to form connective tissue, metabolize iron and to produce energy and antioxidants. It also has niacin or vitamin B6 which

helps metabolize food into energy and synthesizes fatty acids. Vitamin B6 is essential for our body as it is present in more than 100 chemical actions in our body.

3. Shiitake Mushrooms

Shiitake mushrooms are one of the popular mushrooms in the world and for a good reason. They are known for their rich, savoury taste and various health benefits. This mushroom is a native of Japan. In Japanese, shiitake means "oak fungus." Fresh Shiitake mushrooms have a light woody flavour and aroma. These have a meaty texture and are chewy, and go well with almost everything. They are popular for their medicinal properties and are found in powdered supplement form in many herbal pharmacies. They are also known as black forest, black winter, brown oak, Chinese black, black mushroom, etc., Shiitake has a rich flavour than most mushrooms. It is usually used in soups, steamed and simmered recipes and even stir-fried in vegetarian dishes. Low in calories, rich in fibre as well as vitamin B, Shiitake mushrooms are good for boosting the immune system, lowering blood cholesterol levels, hardening of the arteries, diabetes and as an anti-ageing agent. Also, it has promising antibacterial and antiviral effects.



4. Oyster Mushrooms

Oyster mushrooms are one of the biggest types of edible mushrooms which are most common and versatile. Oysters are easy to cultivate and grow mainly on decaying wood. This edible wild mushroom is now grown commercially across the world and has a slightly sweet, anise-like smell while it has tender flesh, velvety texture and mild flavour. The mushroom gets its name due to its similar appearance to the oyster. Oyster mushrooms are mostly fat-free and a good source of essential minerals and vitamins including niacin, riboflavin, vitamin B6 and thiamin. It also has numerous health benefits such as it lowers cholesterol, boosts heart health, better immune function, and improved metabolic health.



5.Enoki Mushrooms



Enoki, also known as Enokitake, winter mushrooms, winter fungus, the edible variety of these mushrooms is small, shiny white caps attached to thin stems, and is crunchy. These mushrooms are usually used in East Asian food and cooking. Enokitake mushrooms are also called golden needle mushrooms. It is known to have a mild and delicate fruity flavour. These mushrooms can be eaten raw and cooked as well as used in salads, soups, sandwiches, and pasta sauces. It has two distinct varieties, wild and cultivated. the wild form differs in texture, colour, dampness and has dark brown colour, shorter and thicker stem while the cultivated mushrooms have long, slender stems with tiny, firm caps. This variety of mushroom is rich in several minerals and vitamins such as vitamin B3, vitamin B5, vitamin B1, vitamin B2, phosphorus, iron, selenium, thiamin, calcium and copper. The mushrooms also contain healthy amino acids and dietary fibre and are low in cholesterol which helps to improve the immunity system, reduces body fat and increases metabolism. It also improves digestion and reduces the chance of developing allergies.



6.Shimeji Mushrooms

These mushrooms are also known as buna shimeji, beech brown mushroom, clamshell mushroom and they grow on dead beech trees. Native to East Asia, this variety is also found in Northern Europe. They have cracked, speckled brown caps and a white base. When eaten raw Shimeji mushrooms taste bitter and when cooked, these brown-capped clusters are crunchy and have a sweet nutty flavour. It is usually used in stir-fried foods and soups, stews and sauces. It can also be sauteed whole, including its stem. Shimeji mushrooms are a great accompaniment to noodles. It is rich in umami tasting compounds such as guanylic acid, glutamic acid, and aspartic acid. It is cholesterol and sodium-free, low in fat and high in dietary fibre. Also, it is a good source of protein, zinc, B vitamins and copper. Shimeji Mushrooms are loaded with health benefits which are reason enough to enjoy them. It lowers cholesterol, aids weight loss, manages diabetes and is natural anti-cancer food. It is also anti-inflammatory, antimicrobial and anti-parasitic

7.Porcini Mushrooms



Porcini mushrooms are one of the most popular mushrooms in Italian Cuisine. These are large mushrooms with a cap that can grow up to 12 inches in diameter. Porcini mushrooms have a few different varieties, are slightly reddish-brown, have a thick stem and are a little sticky to touch. It has an aromatic, woody and nutty flavour which makes it a gourmet mushroom and it is loved for its smooth texture. Porcini mushrooms can be used to make meat dishes, sauces, broth, eggs, pasta and vegetarian dishes. Similar to other varieties of mushrooms, Porcini has its own set of health benefits. They have nutritional benefits that make for a healthy diet, including fibre for gut health, antioxidants that boost immunity, protein for muscle mass, iron for essential minerals and has no cholesterol, trans fat or saturated fat



8.Paddy Straw Mushrooms

It is one of the easiest mushrooms to cultivate. Paddy straw mushrooms were first cultivated in India in the year 1940. It is equally popular as white button mushroom for its flavour, aroma, delicacy and nutrients. These straw mushrooms are cold and good for the summer season. They are rich with protein, fibre, iron, vitamin B and vitamin C, also has mineral extra folic acid, potassium and copper. Paddy straw mushroom's health benefits include reduced cholesterol in the digestive system. It has natural insulin which is good for diabetics, the beta-glucan prevents the growth of cancer cells and vitamin D strengthens bones. It also prevents anaemia and is good for heart health.

9.Meadow Mushroom



The meadow mushroom, *Agaricus campestris*, is a close relative of the common mushroom and looks very similar. The main difference is the color – it's white. In fact, it looks very much like a standard white cultivated mushroom, although it's a separate species. Like the common mushroom, its gills start off pink, then slowly change to dark brown as it matures. Again like the common mushroom this species is usually found on grassland, in clusters. If you find what looks like a common or meadow mushroom in a forest be very wary; pay close attention to the color of the gills. If they're white, don't eat – or even touch – it.

10.Giant Puffball



The puffballs are some of the most distinctive mushrooms. They don't have a stalk and gills like most species; they're roughly round, although often nowhere close to a sphere. As they mature a spore chamber forms inside, and finally this bursts open and releases up to several trillion tiny spores.

The giant puffball, *Calvatia gigantea*, is white and often grows to over two feet in diameter – some monsters reach five feet and can weigh over 40 pounds. They take several weeks to grow and are best eaten when they're immature. The simplest way to test is to slice them in half; if the flesh is white and doesn't show any internal structure, it's good to eat. These mushrooms are usually sliced up and fried – they're delicious cooked in butter or bacon fat. If you cut open something that looks like a small puffball, and you see a stem and gills inside, discard it; it could be a dangerous species.

Puffballs are versatile and can grow in a range of places. They're most often found in meadows, fields or deciduous forests.

11.Chanterelle



This is another distinctive species. *Cantharellus cibarius*, better known as the chanterelle, is a fairly common mushroom and also one of the most highly prized edible ones. It's an excellent source of potassium and vitamins C and D, so adding these to your diet is very useful.

The chanterelle is a yellow or orange color and is funnel-shaped, with yellow ridges running down the outside of the cap. The edges of the cap often curl downwards. Look out for any that have a darker center; there are probably the False Chanterelle, which isn't toxic but doesn't taste very good and can cause stomach upsets. True chanterelles have a uniform color.

Chanterelles grow in open woodland, so look for them in places where there isn't a lot of undergrowth. They often grow in clusters.

12.Morel



The morel is another mushroom that's very popular with gourmets. The name gets applied to a genus (*Morchella*) of closely related species, which also have a wide variety of local names; in West Virginia they're often called Molly Moochers or Muggins, but Kentucky has come up with the colorful name of Hickory Chicken.

Morels don't look very appetizing. They have a pale brown to white cylindrical stem, similar to a regular mushroom, but the brown cap is very different. It's tall and slim, and has a spongy look – the surface is wrinkled and pitted, so it looks like it's honeycombed with holes. Don't worry about the appearance, though – these mushrooms are delicious.

Beware of false morels; these are toxic, and in large quantities can cause loss of muscle coordination. As this can also affect heart muscle they're dangerous. The cap of a false morel looks more wrinkled, like the surface of a brain, while true morels have the classic honeycomb look. If you're in any doubt cut the stem in half. True morels have a hollow stem, but in false morels, it's filled with something that looks like cotton balls.

Morels are woodland mushrooms and seem to have a close relationship with trees. In the western USA you're most likely to find them in coniferous forests; further, east they often grow under ash, cottonwood, apple trees, and dead or dying elms.

REFERENCE: <https://www.thespruceeats.com/edible-mushroom-varieties-1807698>

Unit 1 Non-Edible Mushrooms

1. Death Cap



The name of this mushroom should warn you that it's bad news – and it is. The Death Cap, *Amanita phalloides*, is one of the most poisonous known fungi; half a mushroom is enough to kill an adult. The toxins they contain are temperature-stable, so can't be destroyed by cooking, and are also dangerous if absorbed through the skin. Once poisoned treatment is very difficult; the toxin attacks the liver, and sometimes a transplant is necessary. Over half of all mushroom fatalities worldwide involve death caps; this is a formidable record, as it's only native to Europe. It's believed that spores came to the USA in imported chestnut trees and it's also now found in Australia, southern Africa and parts of South America.

People who've eaten death caps say they have a pleasant taste. That, and the fact that no symptoms appear until several days after eating it, mean people often eat large quantities before becoming ill. It also looks a lot like several edible species, including the Caesar's and Straw mushrooms.

The death cap has a white stem and a pale olive cap with the classic mushroom shape – hemispherical when young, turning to flat and broad – up to six inches wide – as it matures. Immature ones can be mistaken for common or meadow mushrooms. One way to tell is to check the gills – the death caps are white. Another feature of the death cap is that the young mushroom grows in a white sac called the vulva. When it first emerges from the ground it looks like a small puffball, but as it grows the sac tears open to reveal the mushroom. Part of this usually remains round the stem, where it can resemble the ring on an edible mushroom. Other pieces of it often stick to the cap. The white-spotted red toadstool seen in many illustrations is a relative of the death cap, and the spots are actually pieces of the vulva.

Death caps usually appear in late summer and fall and are found in woodland. This can help tell them apart from common and meadow mushrooms, which are grassland species.

Several historical figures are believed to have been killed by death caps, either accidentally or through assassination. They include the Roman emperor Claudius and Charles VI of the Holy Roman Empire.

2. Destroying Angel



Like the death cap and many others of the most toxic fungi, the several species of Destroying Angel are members of the genus *Amanita*. Some *Amanita* species are edible but most mushroom experts advise avoiding them all on principle – the genus kills 95% of all mushroom victims. The destroying angels are just as toxic as the better-known death cap and look very like them apart from their color. The dominant color is white, which makes them visually similar to cultivated mushrooms; a young destroying angel looks very like a button mushroom.

There are at least five species of destroying angel native to North America, and their ranges overlap to cover the entire USA. All are medium to large mushrooms. When mature they can be more than six inches high and five inches across the cap. Sometimes either the stem or cap

is tinged with pink, tan or yellow. The most reliable way to tell them apart from edible species is to check the gills, which are white.

Destroying angels are woodland mushrooms and are usually found near the edge of forests. They can also appear on the grass near trees or large bushes – fungus filaments can run several yards out from the roots of the tree, and the mushrooms grow from these.

3. Fly Agaric



Amanita muscaria is the classic toadstool. A relatively less poisonous member of the *Amanita* group, it's sometimes eaten as a hallucinogen – but it's still dangerous, and it has caused deaths.

Fly agaric is a large mushroom, reaching up to eight inches across, that's found in woodland across the entire USA. It's also immediately recognizable. The stem is white, with a skirt or false ring created by the remains of the vulva. The cap is usually bright red, although brown varieties exist. It's covered with small white warts; these are pieces of the vulva which stuck to the cap as the mushroom emerged from its covering. Heavy rain can wash them off, leaving yellowish spots in their place.

Some sources say that fly agaric can be made less toxic by parboiling or drying, but this is not a safe or reliable thing to do. Even prepared, this mushroom can cause serious illness and hallucinations. Avoid it.

4. False Parasol



Chlorophyllum molybdites, usually known as the False Parasol, Green-Spored Parasol or Greengills, isn't as dangerous as the *Amanita* varieties, but it's the most commonly eaten poisonous mushroom in North America – and definitely nasty enough to make you wish you'd avoided it.

The false parasol is a large mushroom, growing up to a foot tall and 16 inches in diameter. The cap is shaped like a flattened cone, is a whitish color and has rough brown scales. The stem is cylindrical and has a prominent ring. The gills are white when immature, slowly turning dark green with age.

Most poisonings from the false parasol happen when people mistake it for a parasol mushroom. In a true parasol the gills are white, sometimes shading to pink; if you see a green color on the gills, avoid it. True parasols also have a snakeskin pattern on the cap under the scales; the cap of the false parasol is smooth.

One to three hours after eating this mushroom, severe symptoms appear. These usually include stomach pain, diarrhea, and vomiting. So far there have been no known deaths, but it can be bad enough to take you out of action for a few days.

5.Sulfur Tuft



This common mushroom grows in forests, usually around fallen trees or decaying stumps. It's often the only mushroom to be found, which tempts people to try it. The taste is very bitter raw, but the bitterness disappears after cooking. Unfortunately, the toxicity doesn't, so it still isn't safe to eat.

The sulfur tuft, also known as the Clustered Woodlover, can be up to five inches tall and 2.5 inches in diameter. The stem is light yellow to orange-brown, with a faint ring; the cap is hemispherical or conical, orange-brown in the middle with pale edges. The gills are yellow when young but darken to green. This mushroom usually grows in dense clusters.

If eaten, symptoms usually appear five to ten hours later and can be severe. Diarrhea, nausea, and vomiting are the most common. Many victims also collapse, or suffer from paralysis and vision problems. Symptoms take several days to clear up. There has also been one suspected death.

REFERENCE: <https://www.britannica.com/list/7-of-the-worlds-most-poisonous-mushrooms>

https://www.scitechnol.com/peer-review/edible-and-nonedible-wild-mushrooms-nutrition-toxicity-and-strategies-for-recognition-dY0s.php?article_id=7395